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EXAMINER

TANG, KENNETH

ART UNIT PAPER NUMBER

2195

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/893,264

Applicant(s)

SHAVIT ET AL.

Examiner

Kenneth Tang

Art Unit

2195

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-5, 7-9, 11-19, 21-23, 25-33, 35-37, 39-47, 49-51 and 53-57 is/are rejected.
- 7) ☒ Claim(s) 6, 10, 20, 24, 34, 38, 48, and 52 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This application is in response to the Amendment filed on 10/31/05. Applicant's arguments have been fully considered but were not found to be persuasive.
2. Claims 1-57 are presented for examination.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. **Claims 1-5, 7-9, 11-19, 21-23, 25-33, 35-37, 39-47, 49-51, and 53-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blelloch et al. (hereinafter Blelloch) (US 6,434,590 B1) in view of Kawachiya et al. (hereinafter Kawachiya) (US 2001/0025295 A1).**

2. As to claim 1, Blelloch teaches a computer system that employs a plurality of threads of execution to perform a parallel-execution operation in which the threads identify tasks dynamically and in which the computer system comprises:

A) a separate status-word field (status buffers SB1) with each of the threads (*col. 5, lines 22-35*); and

B) a mechanism that operates the threads in a manner that each thread (*col. 5, lines 19-47*):

i) executes a task-finding routine to find tasks previously identified dynamically and performs tasks thereby found, with its status-word field containing a value indicating it is active (live tasks), until the task-finding routine finds no more tasks (*col. 12, lines 3-15, col. 13, lines 47-65*);

ii) when the task-finding routine executed in step (i) finds no more tasks, sets the contents of its status-word field a value indicating it is inactive (updates the status buffer SB1 and flag) (*col. 5, lines 19-48, col. 6, lines 44-67 through col. 7, lines 1-36*);

iii) after completing step (ii) and while the status-word field (flag) associated with any other thread contains a value indicating that the other thread is active, continues to search for a task using the ask-finding routine, and, if it finds one, sets (updates) its status-word field contents to a value indicating that it is active before attempting to execute a found task (*col. 5, lines 19-48, col. 6, lines 44-67 through col. 7, lines 1-36*);
and

iv) during step (iii) when none of the status-word fields contains an activity-indicating value that an associated thread is active and no task has been found, terminates (operation ends) its performance of the parallel-execution operation (*col. 5, lines 40-52*).

3. Blleloch teaches using a buffer manager BM1 to manage the various status buffers SB1 (contains the status-word field) (*col. 5, lines 22-35*) but fails to explicitly teach using a mechanism (global status word) that associates with the separate status-word field of the threads. However, Kawachiya teaches a parallel processing garbage collection system that uses global reference objects of states/status associated and substituted with other objects of states/status (*page 2, [0020]*). It would have been obvious to one of ordinary skill in the art at the time the

invention was made to include the feature of using a global status word that associates with the separate status-word field of the threads because this would increase the control of the system by allowing the thread to detect the occurrence of a condition whereby the state of object should be changed (*page 2, [0020]*).

4. As to claim 2, Kawachiya teaches a computer system wherein the parallel-execution operation is a garbage-collection operation (*page 1, [0014]*).

5. As to claim 3, Blelloch teaches a computer system as defined in claim 1 wherein:

A) each thread has associated with it a respective work queue in which it places task identifiers of tasks that thread identifies dynamically; B) the task-finding routine executed by that thread includes performing an initial search for a task identifiers in the work queue associated with that thread and, if that work queue contains no task identifiers that thread can claim, thereafter performing a further search for a task identifier in at least one other task-storage location (*col. 5, lines 19-52, col. 12, lines 3-15, col. 13, lines 47-65*).

6. As to claim 4, Kawachiya teaches a computer system wherein the parallel-execution operation is a garbage-collection operation (*page 1, [0014]*).

7. As to claim 5, Blelloch teaches a computer system wherein the at least one other task-storage location includes at least one work queue associated with a thread other than the executing thread (*col. 5, lines 19-52*).

8. As to claim 7, Blelloch in view of Kawachiya fails to explicitly teach wherein the task-finding routine includes selecting in a random manner the at least one work queue associated with a thread other than the executing thread. However, "Official Notice" is taken that both the concept and advantages of providing that selecting in a random manner at least one work queue associated with a thread other than the executing thread is well known and expected in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include selecting in a random manner at least one work queue associated with a thread other than the executing thread to the existing system in order to ensure an unbiased selection.

9. As to claim 8, Blelloch teaches wherein the further search includes repeatedly searching a work queue associated with a thread other than the executing thread until the executing thread thereby finds a task or has performed a number of repetitions equal to a repetition limit greater than one (*col. 5, lines 19-52*).

10. As to claim 9, it is rejected for the same reasons as stated in the rejection of claim 7.

11. As to claim 11, Blelloch teaches wherein the contents of all of the status word fits in a memory location accessible in a single machine instruction (every action requires a single time step to be executed) (*col. 11, lines 12-15*).

Art Unit: 2195

12. As to claim 12, Blleloch teaches a computer system wherein the parallel-execution operation is a garbage-collection operation (*page 1, [0014]*).

13. As to claim 13, Blleloch teaches wherein each status-word field is a single-bit field (flag) (*col. 6, lines 44-67*).

14. As to claim 14, Blleloch teaches wherein the activity-indicating value is a logic one and the inactivity-indicating value is a logic zero (flag) (*col. 6, lines 44-67*).

15. As to claims 15-19 and 21-23, they are rejected for the same reasons as stated in the rejection of claims 1-9.

16. As to claims 25-28, they are rejected for the same reasons as stated in the rejection of claims 11-14.

17. As to claims 29-33, they are rejected for the same reasons as stated in the rejection of claims 1-5.

18. As to claims 35-37, they are rejected for the same reasons as stated in the rejection of claims 7-9.

19. As to claims 39-42, they are rejected for the same reasons as stated in the rejection of claims 11-14.

20. As to claims 43-47 and 49-51, they are rejected for the same reasons as stated in the rejection of claims 1-9.

21. As to claims 53-56, they are rejected for the same reasons as stated in the rejection of claims 11-14.

22. As to claim 57, it is rejected for the same reasons as stated in the rejection of claim 1.

Allowable Subject Matter

23. Claims 6, 10, 20, 24, 34, 38, 48, and 52 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

24. During patent examination, the pending claims must be “given their broadest reasonable interpretation consistent with the specification.” *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d

1664, 1667 (Fed. Cir. 2000). Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).

25. *Applicant argues on page 16 of the Remarks that separate instructions of a single process could not constitute "threads".*

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "separate instructions of a single process") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

26. *Applicant argues on page 16 of the Remarks that the assignment manager in Blelloch does not perform the tasks that has "found".*

In response, the Applicant's claims do not state that the same thing that finds the task has to execute the task. Applicant is arguing more narrowly than the scope of the claim language.

27. *Applicant argues on page 17 of the Remarks that Kawachiya and Blelloch are not related to each other, and therefore, should not be combinable.*

In response, Kawachiya and Blelloch are both in the same field of endeavor of thread processing. Kawachiya and Blelloch do not teach away from each other.

28. *Applicant argues on page 17 of the Remarks that Blelloch does not teach or suggest that the assignment manager terminates itself.*

In response, the Examiner asserts that it is the thread that terminates itself, not the assignment manager. Blelloch shows in many places that the thread terminates itself with an end instruction (*col. 10, lines 34-35 and 64-65, col. 11, lines 29-32, etc.*).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

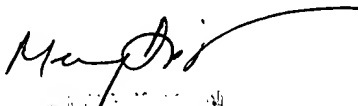
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth Tang whose telephone number is (571) 272-3772. The examiner can normally be reached on 8:30AM - 6:00PM, Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kt
2/17/06


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